

Claims

[c1] What is claimed is:

1. A method of forming patterns on a surface of a photo-mask, the method comprising:
providing a photo-mask; and
forming an integrated circuit layout on the surface of the photo-mask, and forming a plurality of dummy patterns outside the integrated circuit layout on the surface of the photo-mask;
wherein a phase difference of 180 degrees is detected between a transmitted light of the integrated circuit layout and a transmitted light of the dummy patterns.

[c2] 2. The method of claim 1 wherein the plurality of dummy patterns are used to reduce the difference in pattern density on the surface of the photo-mask so as to modify optical proximity effect occurring in a pattern transferring process.

[c3] 3. The method of claim 2 wherein the integrated circuit layout is transferred to a photoresist layer formed on a surface of a substrate by the pattern transferring process.

- [c4] 4. The method of claim 2 wherein the plurality of dummy patterns are nonprintable dummy patterns and not transferred to the photoresist layer during the pattern transferring process.
- [c5] 5. The method of claim 4 wherein the dimensions and the numbers of the dummy patterns are designed according to exposure wave length and numerical apertures of the pattern transferring process and the materials included in the photoresist layer.
- [c6] 6. The method of claim 5 wherein the edge length of each dummy pattern is a multiple of exposure wave length, and the multiple is less than 0.6.
- [c7] 7. The method of claim 5 wherein the distance between each dummy pattern is a multiple of exposure wave length, and the multiple ranges between 0.3 and 2.0.
- [c8] 8. The method of claim 5 wherein the least distance between the dummy patterns and the circuit layout is a multiple of exposure wave length, the multiple ranges between 0.4 and 2.0.